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Interactive comment on "A fast TDR-inversion technique for the reconstruction of spatial soil moisture content" *by* S. Schlaeger

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I appreciate the response from anonymous referee #1, and in particular the two specific comments. The main aspect of the articles is the determination of the capacitance profile $C(x)$ and the conductance profile $G(x)$. To get these distributions nearly all calculation capacity is needed. Two subsequent steps are required to receive a soil moisture profile from these data. First the dielectric permittivity of the soil $\epsilon(x)$ can be calculated by a transformation using probe dependent calibration functions. Then the soil moisture can be estimated using material dependent calibrations or analytical mixing rules. Both subsequent transformations are not the main part of my article. Especially the correlation between dielectric permittivity (as a function of frequency) and the water content of a given material is not trivial. I think I have to point out this aspect more clearly.
The second referee's comment is about the experimental validation. The reflection data which are used as input for the reconstruction procedure are generated analytically.

Therefore the electrical parameters from table 2 are used to generate artificial TDR-traces. So no test equipment can be specified. The electrical parameters are used arbitrary but they are comparable to similar field experiments with the flat-ribbon-cable shown in figure 5 and usual sand. For our analytical example we use a flat-ribbon-cable (as example) of length 2m and a coaxial cable with a length of 0m. So the effect of electrical loss inside the feeding cable vanishes. This excitation signal that causes the reflections inside the probe is also needed for the reconstruction algorithm (see eq. 6). But, when using real measurements we will not use the pulse that is generated inside the TDR device. Instead of this signal, we will use the pulse that occurs at the end of the feeding line at the point x_1. We measure this pulse using the TDR reflection of an open coaxial cable of the same length and type than the one connected to the probe. This reference measurement includes all information and influence of the feeding cable.
Finally the determination of the relevant parameters (such as the inductance L_a or L_0) is not mentioned in the article yet. I will include an additional reference.

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 971, 2005.